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ABSTRACT

A study was made of the research on perceptual-motor development programs and their effect on reading readiness or reading achievement. The selection of 11 studies was based on specific criteria such as a minimal sample size of 40 subjects, an experimental period of at least 18 weeks, and a pretest post-test research design with experimental and control groups. The studies were divided into those which supported the hypothesis that programs of perceptual-motor development enhance reading readiness or achievement of intellectually able students and those which did not. Three of the five studies supporting the hypothesis were with students who were behind in reading or from a low socioeconomic environment. A summarization of the studies refuting the hypothesis revealed that 83 percent of the studies were with kindergarten or primary-grade children who, in general, were not experiencing learning disabilities. On the basis of this review it was concluded that the hypothesis could be neither confirmed nor denied. The importance of the research may be in specifying the conditions under which perceptual-motor programs are appropriate--that is, for disadvantaged children as a preventive program and for some children with learning disabilities as a remedial program. A bibliography is included. (DH)

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PERCEPTUAL-MOTOR DEVELOPMENT AND READING: A CLOSER LOOK*

Since the early sixties programs of perceptual-motor development have been used for various purposes in schools and clinics across the country. In addition, there is an ever increasing amount of research being completed by reading, special education, early childhood, and physical education specialists. The fact that research investigating the value of perceptual-motor programs is being undertaken by people from different disciplines is advantageous. However, compilation of these studies is made difficult and the implications for educational programming are slowed in reaching administrators and teachers.

An earlier paper (6) reviewed twenty-eight research studies which proposed to determine the effectiveness of programs of perceptual-motor development upon reading readiness or reading achievement of intellectually able students. The main conclusions of this review were as follows:

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"The effectiveness of perceptual-motor development programs in improving reading ability can neither be confirmed nor denied. In general, perceptual-motor programs employing a wide variety of experiences appear to show promise with underachieving intermediate grade students and pre-school children. The effectiveness of Delacato and Frostig type programs is doubtful."

These conclusions were based on the review of all research located, despite possible criticism of some studies. Therefore, a question arises as to whether the conclusions would differ if only research of the highest quality was considered for inclusion in the review. In an attempt to answer this question a criteria defining limits of acceptability for research to be reported were established. This criteria was applied to the studies presented in the previously cited paper and also to research located within the past year by this writer. The reason for following this procedure was to avoid basing conclusions on the inadequacies which characterize a large portion of the research pertaining to this topic.

The research which was accepted for inclusion in this review met criterion measures which were stated as follows:

1. Incorporation of programs of perceptual-motor development which were comprised of a wide variety of movement based experiences which require accurate sensory interpretation to perform tasks ranging from large muscle locomotor patterns to precise fine muscle coordination. Accordingly the limited perceptual-motor development activity approaches of Delacato; The Winter Haven Program; and Frostig, prior to 1970; when used independently of other perceptual-motor development activities were excluded from this review.
2. A large sample, at least forty subjects equally divided between the control and experimental groups was considered the minimum number.
3. An experimental period of one half of a school year, 18 weeks, was considered the minimum length for inclusion in this study. In addition a post-investigation follow-up of the subjects' achievement was included as an extra measure. This would indicate retention of gains or effects accrued after the termination of the special program.
4. A pre-post test research design with experimental and control groups was deemed desirable. This would account for changes possibly occurring as

a result of maturation, regular instruction, or special effects. Several studies failed to include a pretest but were reported because of high ratings on the other criterion measures.

5. Reasonable control of intervening variables was also sought in the studies accepted. Some researchers would insist on rigorous control but this is extremely difficult in applied research occurring in school situations.

6. The utilization of proper statistical analysis of the data and conclusions based on the attained results were included in the criteria. Occasionally inappropriate statistical analysis is used and more frequently conclusions reflect conscious or unconscious bias.

Research Findings

From a total of 38 studies* investigating the influence of perceptual-motor development programs upon reading 11 studies rated highly according to the review criteria. These studies deserved a closer look. The studies are presented according to whether they support or reject the hypothesis that programs of perceptual-motor development enhance reading readiness or achievement of intellectually able students. For the purpose of this paper an intellectually able student is non-mentally retarded.

*A bibliography will be provided upon request.

Studies Supporting the Hypothesis

A physiology of readiness experiment through perceptual-motor training was conducted by McCullouch (8) for the Ripon Wisconsin Public School System. Two kindergarten classes were selected to participate in the study which lasted eighteen weeks. One class received 30 minutes of perceptual-motor training plus 10-20 minutes of selected Frostig materials daily while the other class was used as control subjects. The students were pre and post tested using measures of visual perception, mental ability and readiness skills. Analysis of the data collected revealed that the experimental group made significantly greater gains on the Metropolitan Readiness Test while no significant differences were found for the Otis-Lemon Mental Ability Test and the Gates-MacGinitie Readiness Skill Test. The hypothesis that academic readiness can be systematically developed on a physiological basis was accepted.

In a study using 76 culturally disadvantaged kindergarten children as subjects Turner and Fisher (17) concluded that "intensive exposure to verbal concepts, paired with concrete examples and movement may have been a major program effect in enhancing reading readiness." In this study Kephart type activities were incorporated in the experimental kindergarten program which was conducted for

two hours per day for seven months. Possible criticism of this study include the fact that the Metropolitan Readiness Test and the Purdue Perceptual-Motor Survey were given only at the end of the study.

The New Jersey State Department of Education (11) followed 275 primary grade children during a three year period. The subjects were similar, except the experimental subjects were one year behind the control subjects in reading. The experimental group received a perceptual-motor development program in addition to regular school instruction. After one year the control group continued to perform significantly higher on academic tests. At the end of the second and third years no significant differences between the two groups were found. It was noted that the subjects receiving perceptual-motor training "appeared to have the faster growth rate" and slower children seemed to have benefited from the special training, whereas, the other children generally had not. The measurement instruments consisted of the California Achievement Test, The Gates Reading Test, and the Metropolitan Readiness Test.

Weisman and Leonard (18) used a multi-disciplinary approach in an attempt to develop verbal and reading skills of low socio-economic level children. A team consisting of a physical education specialist, social worker, and

classroom teacher worked with 20 students selected at random to be in the experimental group from the middle of kindergarten through the first grade. Perceptual-motor development activities based on the work of Cratty, Frostig, Kephart, and others was a major part of the physical education program which, in general, met for 30 minutes daily during the experimental period. Development in areas such as: balance, body image, ocular control and perception of figure-ground relationship was stressed because it was believed they were "important prerequisites to learning to read." The first phase of the study did not employ statistical comparison but the experimental subjects performed at higher levels on the Bettye Caldwell Pre-School Inventory Expressive Verbal Test; verbal section of the Primary Mental Abilities Test, and the tests accompanying the SRA Reading Program than did the control group. Moreover, after a period of one year and without additional special instruction, the students who completed the multi-disciplinary program including perceptual-motor development training scored significantly higher on the Primary Reading Profile Test - Level I than did the 20 subjects who had not received this program.

A study by Faustman (4) involved 200 children to determine the effect of perceptual training in kindergarten upon first grade success in reading. The experimental treatment included Frostig, Strauss and Kephart perceptual-motor activities.

Differences between groups were found for form perception at kindergarten and first grade level. No difference in reading, as measured by The Gates Word Recognition Test , was found at the end of kindergarten. However, the experimental group was superior in reading ability in testing during November and May of the first school year. It was concluded that the greater gains for the experimental group could be attributed to the effect of the perceptual-motor training in kindergarten.

In summary, of the five studies supporting the hypothesis sixty per cent of the studies were with students who were behind in reading or from a low socio-economic environment. The remaining studies had as subjects children who were attending kindergarten. Several of the studies had special treatment influences operating in addition to perceptual-motor programs. The studies were those of Turner and Fisher (11) and Weisman and Leonard (18). In addition, McCulloch's (8) study found significantly greater gains for the Metropolitan Readiness Tests but not for the Gates-MacGinitie Readiness Skills Test. The latter test is the more extensive of the two tests and includes measures of auditory discrimination, following directions and auditory blending.

Studies Rejecting the Hypothesis

Fisher (5) studied the effect of two different types of physical education program upon motor skill development and academic readiness of two groups of kindergarten children

receiving the same instructional program. One group participated in a traditional game type physical education program whereas the other participated in individualized perceptual-motor development activities during physical education periods. Each program was conducted for twenty minutes per day, five times a week for twenty-two weeks. The results of a motor ability test, general intelligence test and general readiness test showed no significant differences between groups.

A Kephart type program of perceptual-motor activities resulted in significant differences in internal awareness but not perceptual ability, reading readiness or achievement for first graders. O'Connor's (12) study extended for 6 months during first grade for 59 male and 64 female students. The only difference in instruction were the special treatment group received perceptual-motor activities and the control group participated in traditional physical education activities. "The conclusion drawn from this study is that change in gross motor ability elicited by the Kephart type gross motor activities does not necessarily effect change in perceptual or academic ability of the average first grader."

Slacks (15) conducted a program almost replicating O'Connor's study wherein 54 first grade students received perceptual-motor activities as advocated by Kephart while 48 students participated in regular physical education activities. The programs lasted for 6 months and both groups, 4 classes,

received similar classroom instruction. The Perceptual Forms Test, Metropolitan Readiness Test, Metropolitan Achievement Test, teacher ratings, and overall academic performance were used in this study. The finding of no difference between group performance on the test measures was essentially the same as O'Connor's (12).

Primary level children identified as having learning disabilities were subjects in a study by Litchfield (7). This study used a program of visual-motor-perceptual activities with 80 grade one, two and three students over a six month period of half-hour sessions each school day. The data collected consisted of scores on a fine screening instrument, Lorge-Thorndike Intelligence Test, Stanford Achievement Test and Gates-McGinitie Reading Test. No significant differences were revealed by statistical analysis for intelligence and achievement measures.

A program of body management incorporating a diverse range of perceptual-motor activities was reported by Braley (1) for the Dayton Ohio Public School System. A longitudinal research study was conducted to determine the effect of perceptual-motor training on four year old children and its influence on school achievement at the end of the first grade. An experimental sample of sixty-five children received early childhood experiences including body image,

basic body movement, eye-hand and eye-foot coordination, form perception and rhythm. A match control sample received similar educational experiences but did not participate in the systematic perceptual-motor development program. The findings indicated that the perceptual-motor program enhanced perceptual-motor performance to a significantly greater than maturation at both pre-kindergarten and pre-first grade levels. Moreover, at the end of first grade the experimental group showed significantly greater achievement in auditory discrimination but not reading.

Primary grade classes, 108 children, received regular school instruction plus one of the following physical activity programs: free play, perceptual-motor, traditional physical education, adaptive physical education in a study by McRaney (10). The length of the study was twenty weeks and the subjects received daily 35 minute periods of the specified physical activities. Pre and post testing consisted of the Metropolitan Readiness Test, Metropolitan Achievement Test, and Purdue Perceptual-Motor Survey. No significant differences were found among the groups for perceptual-motor ability, mental ability or educational achievement.

A summarization of the studies refuting the hypothesis revealed that 83% of the studies were with kindergarten or primary grade children who, in general, were not experiencing learning disabilities. Of the five studies which included

measures of perceptual-motor ability only two found significantly greater improvement in these measures for the experimental group when compared to the control group. Thus perceptual-motor ability was increased without a concomitant increase in reading achievement which is contrary to claims made for such programs.

Comments

Programs of perceptual-motor development appear to be developmentally appropriate in view of the writings of authorities in child development (3, 9), child psychology (13), and visual perception (14, 16). But research indicates the case for perceptual-motor development in enhancing reading achievement has, in general, been overstated. Is this because perceptual-motor development programs at present are, in large part, given after the critical period in the developmental progression has past? Could it be that the reliance upon statistical analysis which is based on group data is misleading and a closer look should be given to individual case studies and clinical evidence? Or could it be that a common neurological factor does not underly both perceptual-motor and reading achievement and the best way to teach reading is to teach "letters and words and to do it thoroughly" (2)? The answer to these questions can only come from research which yet remains to be done.

Perceptual-motor experiences have a place in physical education and classroom programs of day care, early childhood, and primary grade education. Perceptual-motor experiences for these children should emphasize sequential development of a repertoire of neuromuscular skills which allow the individual to: understand his body schema, discover his movement potentialities, develop efficient postural and locomotor patterns, and act with an accurate motoric response based on appropriately integrated input from the sensory milieu. The desired outcomes of enhanced movement efficiency and physical self-concept are more likely to occur as a result of developmentally sequenced perceptual-motor activities than from the traditional free play or competitive game approach to physical education.

Conclusions and Implications

The hypothesis that perceptual-motor development programs positively influence reading achievement can neither be confirmed nor denied on the basis of the research reviewed. This, however, is a generalization. What is important is specification of the conditions under which any educational activity is to be applied. In this respect, it seems that individualized perceptual-motor programs are developmentally appropriate for disadvantaged children as a preventive program or for some children with learning disabilities as a remedial program. When perceptual-motor development programs are used for all

children without respect to their prior environmental experience any positive influence upon reading is doubtful. The inclusion of perceptual-motor activities in replacement for free play and game oriented physical education in day care, early childhood education or primary grade school programs is desirable. The best advice for the teacher responsible for facilitating opportunities for a person to exercise his right to read is to consider perceptual-motor programs as having value in being a supplement, not a substitute, to individualized competency based reading instruction.

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